FACT SHEET FOR NPDES PERMIT
NO. WA-002080-0

CITY OF PROSSER
PUBLICLY-OWNED TREATMENT WORKS

DATE OF THIS FACT SHEET – SEPTEMBER 15, 2006
DATE OF EXPIRING PERMIT - OCTOBER 31, 2011

SUMMARY

The City of Prosser (the City) is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) Permit for the City Publicly-Owned Treatment Works (POTW). The City owns and operates a wastewater collection system and treatment plant, which conveys and treats wastewaters discharged from residential, commercial and industrial customers. The City completed an extensive upgrade of the treatment plant in 2002. The upgraded treatment plant utilizes trickling filter, clarification, and sequencing batch reactor treatment processes and discharges disinfected effluent to the Yakima River. The City's POTW is classified by the U. S. Environmental Protection Agency as a major municipal discharger.

The City has extended the collection system to the East Prosser Industrial Park. The plant upgrades allow the facility to achieve better-than-secondary-level treatment standards. This high performance standard was established in response to the impaired water quality status of the lower Yakima River. In addition to improving treatment standards the upgrade increases the reliability of individual treatment processes and combines the domestic and industrial treatment trains, which were previously separated.

The City's responsibilities for compliance monitoring include routine sampling of influent and effluent, characterization of priority pollutants present in the influent and effluent twice during the permit term, whole effluent toxicity chronic (WET) characterization of the discharge prior to application for permit renewal and chronic (WET) monitoring in association with a chronic WET limit.

Based on a new low-flow-regulated regime of 300 cubic feet per second for the portion of the Yakima River in the vicinity of the Prosser POTW, new dilution factors have been calculated. Using the new dilution factors, the Department of Ecology evaluated whether there is a reasonable potential for chlorine and ammonia to exceed the water quality criteria. Reasonable potential to exceed established water quality limits for ammonia and chlorine was not found. However, existing limitations and monitoring for these compounds will continue.

No reasonable potential for the effluent to exceed water quality criteria for human health has been determined for the trihalomethanes and pesticides found in the effluent. Therefore no limits for these compounds are required under this permit.

TABLE OF CONTENTS

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Prosser
Facility Name and Address	City of Prosser Publicly-Owned Treatment Works (POTW) 999 Grande Road Prosser, WA 99350
Type of Treatment	Primary clarification, trickling filter, intermediate clarification, sequencing batch reactor, anaerobic digester, chlorination and dechlorination
Discharge Location	Yakima River, River Mile 46.5 Latitude: 46º 12' 46" N Longitude: 119º 45' 47" W
Water Body ID Number	WA-37-1010

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The City of Prosser is located in Benton County, on Interstate 82, approximately 50 miles southeast of Yakima, Washington. The City straddles the Yakima River, with most residential areas concentrated south of the river and the Benton County Port District areas located north of the river. The wastewater treatment plant and the City's retired sprayfield are also located north of the river. The City has a population of approximately 5,000.

History

The original domestic collection system was built in the 1920s and, until 1958, handled all industrial flows and sanitary sewage. In 1958 the industrial collection system was constructed after industrial flows had exceeded the capacity of the existing combined sewer system.

The City's wastewater treatment plant was originally constructed in 1948 as a single trickling filter treatment facility with a 10-inch influent siphon across the Yakima River. In addition, the original anaerobic digesters, currently serving as secondary anaerobic digesters, were constructed in 1948. Improved control of water pollution was accomplished by the addition of a secondary clarifier and aerated grit chamber in 1958, as well as the construction of a 12-inch siphon for industrial wastes. The treatment plant was upgraded in 1967 by the addition of a primary clarifier, a second larger trickling filter, a vacuum filter, an anaerobic digester and another secondary clarifier. Operational difficulties necessitated extensive modifications in plant design in 1968 and 1969. Additional treatment capacity was added in 1970, as well as completing a separation of domestic and industrial influent.

From 1986 through1988, the City finished a significant POTW upgrade which included:

(1) Construction of a Sequencing Batch Reactor (SBR);
(2) A second domestic sewage siphon across the Yakima River;
(3) New chlorination facilities;
(4) Sulfur dioxide dechlorination;
(5) A new outfall diffuser in the Yakima River;
(6) Conversion of the industrial primary clarifier to an aerobic holding tank for temporary sludge holding;
(7) Elimination of the vacuum filter system;
(8) Taking the small trickling filter out of service; and
(9) Treating domestic and industrial wastewater together, after first treating the domestic wastewater through the domestic primary clarifier.

Between 1991 and the recently completed upgrade, the City has made significant improvements, including installation of a belt filter press and effluent aeration. In 1998, the primary clarifier was rehabilitated as recommended in the 1997 *Facility Plan*.

The current status of industrial pretreatment by industrial discharger is as follows:

Twin City Foods	Separate treatment facility with emergency connection to City treatment facility.
Milne Fruit	Some pretreatment prior to discharge to City treatment facility.
Tree Top	Separate treatment facility with emergency connection to City treatment facility.
Zirkle Fruit	No pretreatment prior to discharge to City treatment facility.
Snoqualmie Winery	Pretreatment prior to discharge to City treatment facility.
Hogue Cellars	No pretreatment prior to discharge to City treatment facility.

Collection System Status

The City formerly had two separate collection systems which led to the POTW. The collection system is now operated as one system that serves sanitary and industrial sources. The collection system consists of 28.3 miles of gravity sewers, 2.4 miles of force mains and six lift stations. Before 1996, the industrial waste collection system transported process wastewater from the large fruit and vegetable processing facilities to the POTW, across the Yakima River via a 12-inch steel inverted siphon (constructed in 1958). The sanitary sewer transported domestic wastewater to the POTW, across the Yakima River via a 10-inch steel and a 12-inch high-density polyethylene (HDPE) inverted siphon built in 1949 and 1987, respectively.

Severe flooding that occurred during February of 1996 destroyed both the 12-inch industrial and the 10-inch domestic steel siphons which crossed the river. The remaining domestic siphon (12-

inch HDPE), which was imbedded in the river bottom and not disturbed by the flood, was subsequently utilized for delivering all domestic and industrial wastewater to the POTW until new siphons could be constructed. Construction of two new 12-inch HDPE siphons was completed in October of 1996, which allowed the industrial and domestic wastewater to be separated once more.

The previous permit's fact sheet found no need to require an evaluation of Inflow and Infiltration (I&I), as most I&I was determined to originate at the industrial dischargers' facilities (personal communications) and could best be controlled through pretreatment and Best Management Practices (BMPs) activities at those sites. The City is advised to review those on-site practices so that I&I will be minimized.

Treatment Processes

The City's treatment plant has undergone a major upgrade of its processes. As previously configured, the domestic wastewater treatment train consisted of headworks, primary clarifier, an 80-foot diameter trickling filter, clarification, chlorination and sequencing batch reactor. The industrial treatment train consisted of treatment in the 150-foot diameter trickling filter, clarification and sequencing batch reactor. After the combined waste stream received treatment in the sequencing batch reactor, effluent was chlorinated and dechlorinated, aerated, and then discharged.

This upgrade combined the separate domestic and industrial treatment trains to improve general reliability of the system, rather than expand treatment capacity. Treatment processes and the major modifications are briefly described in the following paragraphs. Modifications are more thoroughly described in Chapter 8 of the approved *Wastewater Facility Plan (*pp. 8-6 through 8-25*).* In this plan, recommended treatment plant configuration is designated as Alternative 3A.

Influent Flow Metering

The domestic 12-inch magnetic flow meter has been removed. The three siphons are combined upstream of the headworks. The combined flow is now measured by a new 16-inch magnetic flow meter prior to flow entering the new influent screening structure.

Degritting and Screening

The existing air-lift pumps are now used to transfer grit slurry from the aerated grit tank to the existing above ground grit channel. A new submersible pump installed in the channel transfers grit slurry to a new grit hydrocyclone and classifier. The grit is washed as it passes through the classifier and the washed grit drops into a receptacle for eventual disposal to the landfill. This largely automated system replaces the existing manual system which required frequent cleaning of the grit channel and caused grit to be spilled on the ground outside the headworks.

A new concrete channel was constructed to accommodate a new fine screen with automatic self-cleaning capability. The new screen is equipped with ¼-inch bar spacing to capture rags and other large solids commonly found in wastewater. All screenings are washed and dewatered and disposed of at the landfill. The process largely eliminates the past problem of rags and other debris clogging downstream equipment, such as pumps and the digester.

Primary Clarifier

The domestic clarifier was converted into a primary clarifier in 1998. Because its age, (it was constructed in 1948), the clarifier was completely rehabilitated. Modifications included:

- a 20-inch center column
- energy dissipating inlet
- flocculating feedwell
- spiral scrapers
- launder with Stamford baffle
- scum scraper
- walkway

The rehabilitated clarifier utilized the 70-foot-diameter tank. This clarifier now processes the combined domestic and industrial waste stream. The current improvements added a chemical injection point to allow use of coagulants as a settling aid in the primary clarifier.

Trickling Filters

The treatment plant primary clarifier is equipped with distribution weirs to allow routing to either the 80-foot-diameter trickling filter or the150-foot-diameter trickling filter. The City utilizes the larger filter during normal operations with the smaller unit held in reserve to be used during periods of high load. No modifications of the trickling filters were planned during the recent treatment plant upgrade. The *Facility Plan* describes some possible measures to upgrade the 150-foot filter during Phase II, such as replacement of the 30-year old drive motor however, Phase II is approximately 5 years in the future.

The *Facility Plan* states that due to its size, the 150-foot trickling filter has insufficient capacity to remove all carbonaceous and nitrogenous material from the wastewater; therefore, the unit will continue to function as a roughing filter, removing approximately 70% of the influent BOD (pp. 11-7).

Secondary Intermediate Clarifier

Partially treated wastewater continues to the intermediate clarifier, (formerly known as the industrial clarifier), in which biological growth sloughed from the trickling filter will be removed by sedimentation and pumped to the primary clarifier. This clarifier is newer and in much better

mechanical condition than the unmodified domestic clarifier; modifications completed include: replacement of the existing feedwell with a new energy-dissipating inlet and feedwell to enhance solids removal, and the addition of a chemical injection point to allow the use of coagulants as a settling aid.

Sequencing Batch Reactor (SBR)

Operation of the SBR is configured to provide both anoxic and aerobic cycles to maximize denitrification and BOD reduction (p.11-7). The *Facility Plan* notes that the existing SBR has adequate capacity to serve the City's treatment requirements for the foreseeable future. The document stresses the need for periodic maintenance to ensure reliable operation. The City replaced the decanters in the SBR in 2002. The City has purchased an additional recirculation pump to serve as a standby in the event a pump fails, as the plan recommended (pp. 8-22).

Chlorine Contact Tank

Following the "settle" phase of the SBR cycle, clarified effluent is conveyed by a combination of gravity flow and pumping to the chlorine contact tank for disinfection. The system utilizes chlorine gas, which is dissolved in water and then injected into the wastewater. The system can be operated in either an automatic (flow proportional) or manual mode.

Dechlorination

In order to comply with a Total Residual Chlorine effluent limit of 0.033 mg/L in the previous permit, the City installed a dechlorination system. The system utilizes sulfur dioxide gas and operates similarly to the chlorination system.

Effluent Aeration System

In order to comply with minimum Dissolved Oxygen effluent limits of 4 mg/L, established in the previous permit, the City installed an effluent aeration system in 1996. The system uses compressed air generated by the SBR blowers.

Effluent Pumping System

During high receiving water conditions, such as those that occur during a 25-year flood event or greater, the partially treated wastewater can hydraulically short-circuit the chlorine contact tank. In response to this situation, the City will utilize the existing sprayfield pumps as effluent pumps, with some modifications to ensure proper operating pressure to avoid pump cavitation.

Discharge Outfall

Secondary treated and disinfected effluent is discharged to the Yakima River approximately 0.6 miles downstream of the Chandler Dam (river mile 46.5) via a 20-inch-diameter HDPE pipe. The diffuser is the last 40 feet of the same pipe which has 126 ports (2-inch-diameter each) in two rows located with two ports every 8 inches.

The existing outfall and diffuser were installed as part of the upgrade to the treatment plant in 1988, but were moved downstream by a flood in November, 1990. The outfall is currently oriented at an angle of approximately 45 degrees to river flow and has been rotated such that one row of 63 ports is now pointing 60 degrees upward and the other row of 63 ports is now pointing 60 degrees downward from horizontal with both sets orientated in the downstream direction.

Residual Solids

This wastewater treatment facility produces four separate solid waste streams:

- Grit and Screenings
- Waste Primary Sludge (WPS)
- Trickling Filter Sludge (Humus)
- Waste Activated Sludge (WAS)

Grit and screenings accumulated at the headworks are dried in a small area within one of the sludge drying beds. Prior to hauling off site by Basin Disposal, this material is tested for free liquids using the paint filter test, and for hazardous materials using the toxicity characteristic leach procedure (TCLP) test. Grit and screenings are transported to the landfill once a large enough volume has accumulated in the drying bed to require their removal.

WPS, consisting of co-settled influent solids and intermediate clarifier humus, is transferred to and stabilized in the primary anaerobic holding tank, thickened in the two secondary digesters, transferred by gravity flow to be dewatered by the belt filter press, and dried in the sludge drying beds. WAS from the SBR tanks is transferred to the aerobic holding tank, then dewatered by the belt filter press, and dried in the sludge drying beds. Both sludges are stored in the drying beds pending removal and ultimate disposition to the land application site.

Treated biosolids are removed from the drying beds and land applied at Natural Selection Farms under a permit from the Yakima Health District.

Treatment Plant Classification

In accordance with WAC 173-230-140, the City's treatment plant is categorized as a Class 3 facility. This determination is based on the treatment processes utilized at the facility and design flows. The specific criteria used for this classification are the biofiltration and activated sludge

treatment processes, with design flows of more than 1 million gallons per day (MGD) and less than 10 MGD. In addition, this facility is designed to treat wastewater to tertiary standards, as defined in WAC 173-230-020(21), due to its designed capacity to remove suspended and dissolved substances "significantly beyond" the secondary treatment standards.

Industrial Users

At this time (April 2006), six significant industrial users (SIUs) discharge to the City's collection system. Milne Fruit Products produces fruit juices and other fruit products. Snoqualmie Winery, Hogue Cellars, and Zirkle Fruit, are involved in the wine industry. Tree Top, Inc. which produces fruit juice and fruit products. Twin City Foods, Inc. is a potato foods processor. Tree Top, Inc. and Twin City Foods, Inc. have built their own on-site treatment systems and discharge only small volumes of process wastewater to the POTW in times of emergency.

There are three Port District areas which either contain, or have the potential to contain, industrial facilities. The first is located in the northwest portion of the City, north of the Yakima River and west of Wine Country Road. The area includes the airport and other areas for future industrial development. The City's collection system was extended to this area in 1987. The second, known as the North Prosser Business Park, is located in the northern portion of the City, north of the Yakima River and east of Wine Country Road. This area includes new commercial development and has room for future commercial development. The third area, known as the East Prosser Industrial Park, is located in the eastern portion of the City, south of the Yakima River. Facilities located in this area include Tree Top, Inc., Hogue Cellars, Zirkle Fruit, the Freezer Group, and the Port of Benton incubator facility. The City extended its collection system to service this area in 2002.

PERMIT STATUS

The previous permit for this facility was issued on February 11, 2002. The previous permit placed interim effluent limitations on 5-day Biochemical Oxygen Demand (BOD_5), final limits on Carbonaceous BOD (CBOD), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Total Residual Chlorine, Dissolved Oxygen and Ammonia.

An application for permit renewal was submitted to the Department on March 6, 2006 and accepted by the Department on April 4, 2006.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility was last inspected on April 13, 2006.

During the history of the previous permit, the Permittee has remained in substantial compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

INFLUENT CHARACTERIZATION

Loadings to the POTW were reported in DMRs submitted to the Department and are compared with the applicable design criteria as follows:

Table 1: Influent Characterization

Parameter	1999-2001 Characterization		2002- May 2006 Characterization		Max Month Design Criteria	Max Month Percent of Design Criteria
	Average	Max Month	Average	Max Month		
Flow, in MGD	0.62	0.88	0.571	1.21 [a]	1.8	67.2
BOD, in lbs/day	1,958	3,730	2,543.7	61,85 [a]	6,750	91.6
TSS, in lbs/day	1,427	2,061	1,444.9	3,181 [a]	4,722	67.4
Ammonia- N, in lbs/day	82	66	83.9	157.2 [b]	225	69.9
TKN-Nitrogen, in lbs/day	153	269	139.1	313 [c]	325	96.3

[a] Maximum month occurred October 2005.
[b] Maximum month occurred December 2005.
[c] Maximum month occurred October 2005, second highest load was 240.5 lbs/day in November 2005.

Priority Pollutants

Influent was sampled on March 20, 2001 and then again during the current permit period on December 1, 2004 and on September 26, 2005. All metals and cyanide results are presented in the following table. In addition, other constituents with concentrations above the method detection level (MDL) are listed.

The influent is characterized as follows:

Table 2: Overall POTW Influent Priority Pollutant Characterization

Priority Pollutant Parameter	Units	Value 03/20/01	Value 12/01/04	Value 09/26/05
Metals				
Aluminum	µg/L	1,280	-	-
Antimony	µg/L	<5.0 [a]	<5.0	<5.0
Arsenic	µg/L	<3.0	<2.0	<2.0
Beryllium	µg/L	<0.2	<0.2	<0.2
Cadmium	µg/L	<0.3	<0.3	<0.3
Chromium	µg/L	<4.7	<4.7	5.6
Copper	µg/L	27.4	33.8	5.75
Cyanide	µg/L	<10	<0.01	<0.01
Iron	µg/L	670	-	-
Lead	µg/L	3.3	2.5	<0.5
Mercury	µg/L	0.5	<0.3	<0.3
Nickel	µg/L	<10	<10	<10
Selenium	µg/L	<5.0	<5.0	<5.0
Silver	µg/L	<4.7	<4.7	<4.7
Thallium	µg/L	<1.0	<1.0	<1.0
Zinc	µg/L	120	107	85
Volatile Organics				
Bromochloromethane	µg/L	0.77	-	-
Chloroform	µg/L	1.8	3.2	2.9
Dibromomethane	µg/L	0.62	-	-
1,4-Dichlorobenzene	µg/L	1.7	1.25	ND [b]
4-Isopropyltoluene	µg/L	0.44	-	-
Methylene chloride	µg/L	0.49	ND	ND-
Naphthalene	µg/L	0.19 [c]	ND	ND
Phenols, Total	µg/L	70	0.13	0.13
Styrene (Phenanthrene)	µg/L	0.32 [c]	ND	ND
Toluene	µg/L	0.93	1.66	ND
Semivolatile Organics				
Acenaphthene	µg/L	0.16	ND	ND
Diethylphthalate	µg/L	3.5	ND	ND
3- & 4-Methylphenol	µg/L	25 [d]	ND	ND
N-Nitrosodiphenylamine	µg/L	0.15	ND	ND
Phenol	µg/L	4	ND	ND
Pesticides				
Heptachlor	µg/L	0.033	ND	ND

a-Less than symbol (<) means not detected, to the indicated MDL.
b-Constituent was positively identified, but reported concentration was estimated.
c-After secondary dilution
d-ND means not detected

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. Effluent data for the past permit is not provided for comparison because the plant upgrade substantially changed the character of the effluent. The wastewater characterization is based on data collected after the final limitations in the current permit came into effect on April 1, 2004. The effluent is characterized as follows:

Table 3: Effluent Characterization

Parameter	2003 through May 2006 Characterization			Existing Permit Limits	
	2003-2006 Average	Highest Monthly Average	Highest Weekly Average	Monthly Average	Weekly Average
$CBOD_5$, in mg/L	4.41	9.9	NA*	10	15
TSS, in mg/L	6.49	29.0	54.7 [a]	15	23
Fecal Coliform Bacteria, in #colonies/100 mL	23.5	68.8	121 [b]	100	200
Total Residual Chlorine	0.03	.04	Max Day 0.30 [c]	None	Max Day .09
Ammonia, in mg/L	0.31	3.32	Max Day 12.4 [d]	4.4	Max Day 8.8
pH	NA	Range 6.9 to 8		6 to 9 at all times	
Dissolved Oxygen, in mg/L	8.12	Low Mo. Avg 4.2 min	Minimum Daily NA	None	Min Day > 4.0

[*] Not Available
[a] Occurred January 2006
[b] Occurred October 2005
[c] Max Day Occurred February 5, 2005
[d] Max Day Occurred December 29, 2005

Priority Pollutants

The concentration of priority pollutants in the effluent was reported in the NPDES application and the required Influent and Effluent Summary Report. The toxic organics, Bromoform Bromodichloromethane, Chloroform, Gamma BHC and Dichlorobromomethane, were present in the effluent. Most of these compounds are often characterized as byproducts of the chlorine disinfection process except Gamma BHC, which is a pesticide often used in the control of beetles, ticks, lice and other household pests. Gamma BHC was not detected in the influent.

The effluent is characterized as follows:

Table 4: Overall POTW Effluent Priority Pollutant Characterization

Priority Pollutant Parameter	Units	Value March 20, 2001	Value October 3, 2005	
Aluminum	µg/L	144	-	
Antimony	µg/L	<5.0 [a]	<5.0	
Arsenic	µg/L	<3.0	<2.0	
Beryllium	µg/L	<0.2	<0.2	
Cadmium	µg/L	<0.3	<0.3	
Chromium	µg/L	<4.7	<4.7	
Copper	µg/L	4.40	6.20	
Cyanide	µg/L	<10	<0.01	
Iron	µg/L	78	-	
Lead	µg/L	<0.5	<0.5	
Mercury	µg/L	<0.3	<0.3	
Nickel	µg/L	<10	<10.0	
Selenium	µg/L	<5.0	<5.0	
Silver	µg/L	<4.7	<4.7	
Thallium	µg/L	<1.0	<1.0	
Zinc	µg/L	29.0	27.0	
Bis(2-ethylhexyl)phthalate	µg/L	-	15.4 [b]	
Bromochloromethane	µg/L	0.12[c]	-	
Dichlorobromomethane	µg/L	4.2	2.35	
Bromoform	µg/L	0.31[c]	ND[d]	
Chloroform	µg/L	51[e]	8.9	
Methylene bromide	µg/L	<0.033	ND	
1,4-Dichlorobenzene	µg/L	<0.039	ND	
4-Isopropyltoluene	µg/L	<0.038	-	
Methylene chloride	µg/L	0.33 [c]	ND	
Naphthalene	µg/L	<0.06	ND	
Phenols, Total	µg/L	<50	ND	
Styrene (Phenanthrene)	µg/L	<0.037	ND	
Toluene	µg/L	0.051 [c]	ND	
2-Chlorophenol	µg/L	0.25[b]	ND	
2,4,6-Trichlorophenol	µg/L	0.81	ND	
Heptachlor	µg/L	<0.0027	ND	
Gamma-BHC	µg/L	-	12/01/04	9/26/05
			Non detect	0.13

a- Less than symbol (<) means not detected, to the indicated MDL.
b- Analyzed on September 26, 2005
c- Constituent was positively identified, but reported concentration was estimated.
d- ND means "not detected at or above the MDL
e- After secondary dilution.

RECEIVING WATER CHEMICAL ANALYSIS STUDY

Permit condition S12.A. of the current permit required the Permittee to conduct chemical analysis of the Yakima River for selected metals, hardness, pH, temperature and TSS. Nine sets of analyses were conducted between September 2003 and September 2005. The results of the analyses are contained in Table 5 below:

Table 5: Chemical Analysis of Receiving Water

Parameter µg/L	9/22/03	1/26/04	4/22/04	7/27/04	9/22/04	12/28/04	3/7/05	6/29/05	9/27/05
Copper total	1.67	0.92	0.95	1.43	1.18	0.75	0.82	1.07	0.89
Copper dissolved	1.12	.065	0.74	1.26	1.00	0.55	0.61	0.78	0.78
Lead total	0.096	0.089	0.144	0.038	0.104	0.079	0.086	0.162	0.079
Lead dissolved	<0.015	<0.015	0.018	<0.015	<0.015	<0.015	0.018	<0.015	0.016
Nickel total	0.79	0.49	0.40	<0.20	<0.20	0.19	0.18	0.33	0.05
Nickel dissolved	0.38	0.28	0.017	<0.20	<0.20	0.05	0.04	0.15	0.06
Chromium total	0.09	0.29	0.12	<0.35	0.52	<0.07	<0.07	0.34	0.20
Chromium dissolved	<0.07	0.39	<0.07	<0.35	<0.35	0.07	<0.07	0.16	0.13
Zinc total	4.69	1.07	1.01	0.47	0.92	0.92	1.16	1.57	0.19
Zinc dissolved	0.45	0.43	0.43	0.28	0.43	0.38	0.66	0.75	0.14
Cadmium total	<0.008	0.011	0.013	<0.008	0.070	0.012	0.016	0.023	0.010
Cadmium dissolved	<0.008	<0.008	<0.008	<0.008	0.044	0.011	0.011	0.014	<0.008
Selenium total	0.234	0.138	<0.30	0.219	.060	0.69	<0.30	0.35	0.42
Selenium dissolved	0.210	0.156	<0.30	0.248	0.58	0.49	<0.30	0.35	0.38
Silver total	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Silver dissolved	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Mercury total	0.00103	0.00095	0.00171	0.00183	0.00111	0.00110	0.00117	0.00156	0.00095
Arsenic total	2.04	-	1.18	2.64	2.07	1.01	1.24	2.24	2.01
Hardness mg/L	113	92	81.7	156	95.6	79.3	83.6	89.3	127
TSS mg/L	9.5	4.2	6.0	5.4	3.6	4.2	4.6	8.4	3.2
pH	7.8	7.9	7.9	8.1	7.6	7.7	8.02	7.64	7.52
Temperature ºC	15	5	13	23	15	3	11	21	16

SEPA COMPLIANCE

The environmental review documents for the treatment plant upgrade project are contained in appendices of the *Facility Plan*. A photocopy of the State Environmental Policy Act (SEPA) checklist appears in Appendix S. The City, acting as lead agency, issued a Determination of Non-Significance (DNS) that became effective on August 22, 1997.

The City also conducted a review of the project under the State Environmental Review Process (SERP). A photocopy of the SERP checklist appears in Appendix T of the *Facility Plan*. The SERP review was updated in 2001 and a revised Environmental Report was submitted to the Department in March 2001.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36.) The most stringent of these types of limits must be chosen for each of the parameters of concern. The proposed permit establishes effluent limits for the following parameters, CBOD, TSS, Fecal Coliform Bacteria, pH, Total Residual Chlorine, Ammonia, and DO.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on both technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and have been included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation**.** Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(b), the Permittee is required to notify the Department of Ecology immediately upon discovery. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for the upgraded treatment plant are taken from a letter dated November 7, 2001, sent from Gray & Osborne to the Department, and are as follows:

Table 6: Design Standards for the Upgraded City of Prosser WWTP

Parameter	Design Quantity
Monthly average flow (max. month)	1.8 MGD
BOD_5 influent loading (max. month)	6,750 lbs/day
TSS influent loading (max. month)	4,722 lbs/day
Ammonia influent loading (max. month)	225 lbs/day
TKN (max. month)	325 lbs/day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, $CBOD_5$, and TSS are taken from Chapter 173-221 WAC:

Table 7: Final Technology-based Limits

Parameter	Limit
pH	Shall be within the range of 6 to 9 standard units
Carbonaceous BOD_5 ($CBOD_5$)	Average Monthly Limit is the most stringent of the following: - 10 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 15 mg/L
TSS	Average Monthly Limit is the most stringent of the following: - 15 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 23 mg/L
DO	Daily Minimum = 4 mg/L

The average weekly $CBOD_5$ concentration limit of 15 mg/L is 150% of the monthly limit, in accordance with both the relevant regulations and the Department's *Permit Writers Manual*. The

average weekly TSS limit of 23 mg/L is rounded up from 22.5 mg/L, which is 150% of the monthly limit.

The following final technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

$CBOD_5$

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (1.8 MGD) x Concentration limit (10 mg/L) x 8.34 (conversion factor) = mass limit 150 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 225 lbs/day.

TSS

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (1.8 MGD) x Concentration limit (15 mg/L) x 8.34 (conversion factor) = mass limit 225 lbs/day.

The weekly average effluent mass loading is calculated as the maximum monthly design flow (1.8 MGD) x Concentration limit (23 mg/L) x 8.34 (conversion factor) = mass limit 345 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the Washington State Surface Water Quality Standards (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. These numerical criteria are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or could potentially be more stringent than technology-based limitations, they must be used in a permit.

Numerical Criteria for the Protection of Human Health

The U.S. EPA issued 91 numeric water quality criteria for the protection of human health (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from certain surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC. Therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limits are derived for the water body's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses. The critical condition for the pollutants in this discharge is high summer temperature of July, August and September. Flow is regulated to not less than 300 CFS.

Mixing Zones

This permit authorizes an acute and a chronic mixing zone around the point of discharge as allowed by Chapter 173-201A WAC, Washington State Surface Water Quality Standards. The water quality standards stipulate some criteria be met before a mixing zone is allowed. The requirements for mixing zones and Ecology's actions are summarized as follows:

1. The allowable size and location be established in a permit.

This permit specifies the size and location of the allowed mixing zone.

For this discharge, the percent volume restrictions of the water quality standards result in a lower dilution factor than the distance and width restrictions. Therefore, the dilution factor calculated at the controlled low flow was used to determine reasonable potential to exceed water quality standards.

2. Fully apply "all known available and reasonable methods of treatment" (AKART).

The technology-based limitations determined to be AKART are discussed in an earlier Technological Limitations Section of this fact sheet on pp.20.

3. Consider critical discharge condition.

The critical discharge condition is often pollutant-specific or water body-specific and is discussed above.

4. Supporting information clearly indicates the mixing zone would not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses, result in damage to the ecosystem or adversely affect public health.

The Department of Ecology has reviewed the information on the characteristics of the discharge, receiving water characteristics and the discharge location. Based on this information, Ecology believes this discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health.

5. Water quality criteria shall not be violated (exceeded) outside the boundary of a mixing zone.

A reasonable potential analysis, using procedures established by the US EPA and the Department of Ecology, was conducted for each pollutant to assure there will be no violations of the water quality criteria outside the boundary of a mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants shall be minimized.

The size of the mixing zone (in the form of the dilution factor) has been minimized by the use of design criteria with low probability of occurrence. For example, the reasonable potential analysis used the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor and the low flow occurring once in every 10 years. The concentrations of the pollutants in the mixing zone have been minimized by requiring pollution prevention measures where applicable.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone.

A. Acute criteria met as near to the point of discharge as practicably attainable.

The acute criteria have been determined to be met at 10% of the distance of the chronic mixing zone.

B. The concentration of, and duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

The toxicity of pollutants is dependent upon the exposure which in turn is dependent upon the concentration and the time the organism is exposed to that concentration. For example, the US EPA gives the acute criteria for copper as "freshwater aquatic organisms and their uses should not be affected unacceptably if the 1-hour average concentration (in µg/l) does not exceed the numerical value given by $(0.960)(e^{(0.9422[\ln(\text{hardness})] - 1.464)})$ more than once every three years on the average." The limited acute mixing zone authorized for this discharge will assure that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water assuring that it will not cause translocation of indigenous organism near the point of discharge.

C. Comply with size restrictions.

The mixing zone authorized for this discharge meets the size restrictions of WAC 173-201A.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Description of the Receiving Water

The facility discharges to the Yakima River, which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include the Twin City Foods Industrial Wastewater Treatment Facility, approximately ½ mile upstream of City's outfall, and the non-contact cooling water discharge from Milne Foods, which enters the river from the City's storm water sewer outfall. Significant nearby non-point sources of pollutants include numerous agricultural return drains upstream and downstream of the City's outfalls. Probably the greatest impact to water quality in the area of the City's outfall is caused by the diversion of most of the river's flow into the Kennewick Irrigation District's Chandler Canal, which occurs approximately ½ mile upstream of the City's outfall.

Characteristic uses of Class A surface waters include the following:

> water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses. This segment of the Yakima River is on the Department's 303(d) list of water quality-impaired waterbodies for the following parameters: Aldrin, Ammonia-N, DDD, DDE, DDT, Dieldrin, Endosulfan, Endrin, Fecal Coliform Bacteria, Heptachlor, Heptachlor Epoxide, Instream Flow, Parathion, PCB-1254, PCB-1260, pH, Temperature and Turbidity.

Surface Water Quality Criteria

Table 8: Surface Water Quality Criteria

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	21 degrees Celsius (ºC) maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

Consideration of Surface Water Quality-Based Limits for Numeric Criteria

Pollutant concentrations in the discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC.

In support of the 1997 *Facility Plan,* a dilution analysis was performed by Beak Consultants (Appendix O of the plan). The analysis utilized the UM flow model (3rd edition) operated under the PLUMES interface. The analysis showed that the angled orientation of the discharge outfall (see pp.11) is not a significant factor in reducing dilution. However, the movement downstream had the effect of rotating the diffuser pipe in such a way that the ports no longer are parallel to the stream flow.

The analysis showed that a dilution factor of 20.5 is possible at the edge of the chronic mixing zone and 2.4 at the edge of the acute mixing zone when the diffuser is in its as-built configuration. However, the *existing* displaced diffuser has lower predicted dilution factors of 15.7 (chronic) and 1.8 (acute). (*Facility Plan*, pp. 6-53,-54) The *Facility Plan* states that while the consultant's analysis utilized an approach similar to that presented by the Department in the NPDES permit fact sheet, the consultant's modeling was considered more precise because it considered the geometry of the outfall and the river in greater detail (p. 7-5).

The previous permit established the chronic dilution factor of 20 and the acute dilution factor of 2.9. However, the methodology used to establish these dilution factors was unknown. Therefore, the dilution factors in the permit were based on those established in the *Facility Plan*, on page 6-54.

In the fact sheet associated with the current permit, the "critical" condition for the Yakima River was established at 200 cubic feet per second (cfs), rather than the 7-day low flow condition with a frequency of 10 years (7Q10) normally used. The critical condition was established using this rationale because of the highly regulated manner in which the river is managed for irrigation supply.

Dilution factors have been recalculated based on the new flow regimes instituted by the U.S. Bureau of Reclamation, which is contained in the Interim Comprehensive Plan for the Yakima Project. At the worst conditions, flow is to be maintained at 300 cfs. During the summer of 2005, a declared drought year, flows were maintained at levels above the 300 cfs minimum. Flows for the Yakima River at this reach are usually well above 300 cfs and therefore, dilution factors calculated at the 300cfs ambient “critical low flow” level are conservative.

There are considerable differences among dilution model predictions. This is due to limitations inherent in the various models used and the inability of any one model to capture the existing condition of either the outfall configuration, river hydrology or both. No one model quite fits the situation. Cormix-GI v4.3 predicts an acute dilution factor of 3.5 and a chronic dilution factor of 16.3, when mixing occurs below the surface. Modeling for a surface discharge using the Cormix-GI v4.3 model predicts an acute dilution factor of 18.4 and a chronic dilution factor of 46.3. At low flow conditions the diffuser is both below the surface and above it.

The Rivplum V model which models for sidebank-single port discharges yields an acute dilution factor of 7.78 and a chronic dilution factor of 28.8.

Visual Plumes yields an acute dilution factor of 59.7 but, cannot be used to model the chronic dilution factor because the plume is predicted to reach the surface before the edge of the chronic mixing zone.

Because of the model limitations involved with the Prosser outfall discussed above, a mass balance equation has been used for determining the dilution factors. The regulatory volume restrictions of the water quality standards using 25% and 2.5% of the river flow and the highest average monthly flow (1.92 cfs) in the past three years and the maximum daily flow (2.25 cfs) in the past three years (see appendix C), respectively, are more restrictive than the Cormix surface model. The dilution factors established in the proposed permit, derived using mass balance equation, are contained in Table 9.

Table 9: Dilution Factors

	Acute	Chronic
Aquatic Life	4.3	40
Human Health, Carcinogen		40
Human Health, Non-carcinogen		40

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

Ambient data used to model the impacts of the Permittee's discharge to the receiving water are presented in Table 10. Although some of the data used for the water quality modeling for this

facility are now more than 10 years old, they are used because no other data are available at this time.

Table 10: Relevant Receiving Water Data

Parameter	Units	Receiving Water Critical Condition [a]
Alkalinity	mg/L as $CaCO_3$	180
Ammonia, Total	mg/L as N	0.032 [b]
Chlorine, Total Residual	mg/L	0.0
Dissolved Oxygen	mg/L	7.6 [c]
Fecal Coliform Bacteria	#colonies/100 ml	202 [c]
Flow	cfs	300 [d]
Hardness	mg/L as $CaCO_3$	131.4 [c]
pH	Standard Units	8.1 [e]
Temperature	°C	23.0 [e]
River Width at Low Flow	feet	160 [c]
Velocity	fps	0.50 [c]
Max. Effluent Temp	°C	27 [f]

a-The critical conditions of the receiving water are those which would lead to the worst case scenario for polluting the surface water downgradient of the POTW outfall.

b- The ammonia data was taken at the Kiona monitoring station. The value represents the 95th percentile used in the City's Reasonable Potential Analysis.

c-This parameter value was taken from the July 1996 *Wastewater Outfall Evaluation for the City of Prosser, Washington,* prepared by Gray & Osborne, Inc.

d- Value taken from the Interim Comprehensive Basin Operating Plan for the Yakima Project, U.S. Department of the Interior-U.S. Bureau of Reclamation and confirmed via phone conversation with Chuck Garner with the Bureau of Reclamation.

e-Values are taken from the City of Prosser Reasonable Potential Analysis receiving water study, December 2004 are the maximum values observed.

f- Value taken from Permittee's DMRs reported October 2005.

The resulting impacts of the discharge on receiving water dissolved oxygen, temperature, pH, fecal coliform bacteria, and other parameter were determined at "critical" conditions. The results, which are largely the same as in the previous permit, are given in the following paragraphs. Text from the previous fact sheet is used here because the design basis of the present treatment plant upgrade was established in administrative orders issued in the mid-1990s, and then included in the previous fact sheet.

Dissolved Oxygen and BOD_5

During development of the current permit, under "critical" conditions there was a prediction of a violation of the water quality standards by the present treatment facility for dissolved oxygen (DO) in the receiving water. Although the surface water quality standard is 8.0 mg/L, there is no economical and reasonable technology available by which the POTW effluent could achieve that

concentration. AKART technology, however, for this type of facility can produce a minimum concentration of 4.0 mg/L which is shown by the facility's past performance since the installation of an aeration system into the chlorine contact basin. Therefore, the current permit contained a technology-based minimum dissolved oxygen limit of 4.0 mg/L, as well as, the technology-based design monthly average limitation of 10 mg/L $CBOD_5$. This permit limitation will continue in the proposed permit.

Temperature

State regulations contain a special condition for this parameter, applicable from the mouth of the river to river mile 185.6, near Cle Elum. This special condition consists of a revision of the water quality criterion of 21°C.

In addition to the 21°C criterion, WAC 173-201A-130(141) describes two additional criteria the City must satisfy to demonstrate compliance with the temperature criterion:

> When natural conditions exceed 21°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases, at any time, exceed
>
> $$t = 34/ T (23) +9, t = 1.063$$
>
> Where T represents the background temperature in °C, and represents the maximum permissible temperature increase measured at the chronic mixing zone boundary in ºC.

The impact of the discharge on the temperature in ºC of the receiving water was modeled by simple mass-balance mixing analysis at critical condition. The maximum receiving water temperature recorded at the critical condition was 23.0°C and the maximum effluent temperature was 27.0°C recorded in October of 2005. The predicted temperature at the boundary of the chronic mixing zone is 23.1°C and the incremental rise is 0.10°C, which is both below 0.3ºC and Δt at 1.063ºC.

pH

Under "critical" conditions there is no predicted violation of the pH criterion for surface waters with the technology-based limits. The model used zero for the effluent alkalinity due to lack of available data, which is also the most conservative scenario possible. Therefore, the technology-based effluent limitation for pH was placed in this permit.

Fecal Coliform Bacteria

The Department is in the planning stage of conducting a TMDL study to address the water quality-impaired status of the Yakima River for fecal coliform. The Permittee is cautioned that

this permit may be reopened and the effluent limit modified after the water quality criteria are revised and wasteload allocations determined.

The current permit established the water quality based limitation of 100 colonies per 100 ml. The resultant mixing zone quantities of fecal coliform bacteria were modeled by using both the secondary treatment technological limitation of 200 colonies/100 ml and the water quality criterion of 100 colonies/100 ml. Under "critical" conditions, there was a prediction of violating the water quality fecal coliform bacteria criterion using the technology-based limitation. Whereas, using the water quality standard resulted in no prediction of violating the fecal coliform bacteria criterion. Therefore, water-quality based limitation will continue in the proposed permit.

Toxic Pollutants

Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

In an analysis of priority pollutants in the City's effluent, conducted in March 2001, December 2004 and October 2005, the following toxics were determined to be present in the discharge: chlorine, aluminum, ammonia, copper, iron, zinc, and organic compounds (see Table 4 of this fact sheet). A reasonable potential analysis was not conducted on these parameters when the permit was developed because the data would not be representative of effluent discharged by the upgraded treatment plant; the treatment plant upgrade was completed in March 2002.

In the case of the organic compounds reported in the March 2001 and again in the December 2004 and October 2005 effluent characterizations, trihalomethane compounds bromodichloromethane, bromoform, and chloroform were detected in one or more of the tests along with the household pesticide, Gama BHC. The trihalomethanes detected are often byproducts of the wastewater treatment process when chlorine is used as a disinfectant.

Reasonable potential to violate the water quality criteria for copper and zinc was not determined. The concentration levels found in the priority pollutants scans for the other metals were well below the level where a reasonable potential analysis was required. At this time no limits for metals are required for the Prosser STP effluent.

Chlorine and Ammonia

The existing permit has a maximum daily chlorine limit of 0.033 mg/L with no maximum monthly limit. The MDL for chlorine in Method 330.5 is 0.018 mg/L. The Quantification Level is

0.09 mg/L. The associated mass loading limit is 1.36 lbs/day. Exceedances of this limit will not constitute an enforceable violation until the reported concentration meets or exceeds the 0.09 mg/L. To avoid a false limit violation entry in the Water Quality Permit Life Cycle System (WPLCS) data base the chlorine limit will be 0.09 mg/L. The actual limit of 0.033 mg/L will be footnoted in the permit limitations and in the event a more sensitive test is approved during the permit term the calculated limit will become effective.

The existing permit has an average monthly ammonia limit of 4.4 mg/L and a maximum daily limit of 8.8 mg/L. A reasonable potential analysis for the facility to exceed the water quality criteria for ammonia and chlorine was conducted based on the new performance data of the upgraded facility and the newly calculated dilution factors. A determination of no reasonable potential for either ammonia or chlorine to exceed the criteria was made (see Appendix C). However in the interest of anti-backsliding regulation, the current limits for ammonia and chlorine will continue in the proposed permit.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The evaluation indicated the discharge has no reasonable potential to cause a violation of water quality standards, thus effluent limits for human health criteria are not warranted.

Whole Effluent Toxicity

The Washington State Surface Water Quality Standards require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods; however, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

The current permit required the City to characterize priority pollutants in the influent and effluent. Characterization occurred concurrently with WET testing, in accordance with Special Condition S12.B. The current permit requirement was retained from the previous permit because characterization was interrupted by the upgrade.

In accordance with WAC 173-205-040, the Permittee's effluent has been determined to have the potential to contain toxic chemicals. The current permit contains requirements for WET testing as authorized by RCW 90.48.520 and 40 CFR 122.44 and in accordance with procedures in Chapter 173-205 WAC. The current permit requires the Permittee to conduct toxicity testing in order to characterize both the acute and chronic toxicity of the effluent. This testing has been completed.

Accredited WET testing laboratories have the proper testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating a No Observed Effects Concentration (NOEC), LC_{50}, EC_{50}, IC_{25}, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria,* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center at 360/407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice to ensure the proper testing is completed.

Acute WET Testing

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

The acute WET characterizations conducted during the City's current permit cycle indicate no reasonable potential exists to cause receiving water acute toxicity. Therefore the Permittee will not be given an acute WET limit, but will be required to retest the effluent prior to applying for permit renewal in order to demonstrate that the effluent characteristics have not changed.

Chronic WET Testing

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Chronic toxicity was also measured during the current, post-upgrade permit term. This toxicity was found to be at levels that have a reasonable potential to cause receiving water toxicity (WAC 173-205-050(2)(a)). The chronic WET test (khan133), conducted on October 5, 2005 with the algae, *Selenastrum capricornutum,* found the NOEC to be 12.5% effluent and the lowest observed effects concentration (LOEC) to be 25%. A chronic WET limit is needed for the City's effluent discharge because the acute critical effluent concentration (ACEC) is 23% effluent which is between the NOEC and LOEC. In addition, a 25% growth reduction in the test organism (IC25)

was observed at18.4% effluent, which is between the NOEC and LOEC. A chronic toxicity limit is therefore required. The chronic toxicity limit is no statistically significant difference in test organism response between the chronic critical effluent concentration (CCEC), 2.5 % of the effluent, and the non-toxic control water. The chronic toxicity limit is set relative to the mixing zone established in accordance with WAC 173-201A-100. The CCEC is the concentration of effluent existing at the boundary of the mixing zone during critical conditions.

Monitoring for compliance with a chronic toxicity limit is accomplished by conducting a chronic toxicity test using a sample of effluent diluted to equal the CCEC, and then comparing test organism response in the CCEC to organism response in nontoxic control water. The Permittee is in compliance with the chronic toxicity limit if there is no statistically significant difference in test organism response between the CCEC and the non-toxic control water.

In order to establish whether the chronic toxicity limit is eligible for removal from future permits, the Permittee should also determine if a statistically significant difference in response exists between the ACEC and the control.

If the Permittee makes process or material changes which, in the Department's opinion, result in an increased potential for effluent toxicity, the Department may require additional effluent characterization in a regulatory order, by permit modification or a new permit. Toxicity is assumed to have increased if WET testing fails to meet the whole effluent toxicity performance standards in WAC 173-205-020.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

Special Condition S13. of the current permit, required the Permittee to ascertain whether any deposition of sediment has occurred. Visual inspections conducted by the City's consulting engineers, Huibregtse, Louman Associates, Inc., on August 19 and August 22, 2003, found accumulation of sediment was not occurring in the vicinity of the outfall.

TMDL Considerations

A TMDL for pH, dissolved oxygen, fecal coliform and pesticides is being developed for the Lower Yakima River which could include wasteload allocations for phosphorus, nitrogen or both. Phosphorous and nitrogen can be limiting factors in plant growth, which has a direct effect on pH in the water column. This could potentially affect the Permittee's discharge limitations at some time in the future. At this time, however, it is unknown whether a wasteload allocation for phosphorus or nitrogen will be established for the Permittee's facility. Although there are no

specific permit limitations regarding phosphorus or nitrogen in the permit at this time, the Permittee may wish to investigate methods to reduce nutrient loading to the river in advance of any restrictions that could be promulgated in the pending TMDL. Monitoring the final effluent for Total Phosphorus and Ammonia will be required in the proposed permit. The Permittee may request a cessation of Total Phosphorous monitoring after two years under permit section S2.E.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

PROPOSED PERMIT LIMITATIONS

The proposed permit limitations are compared with the existing permit limitations in Table 11, below:

Table 11: Comparison of the Proposed Permit Limitations with the Exiting Limitations

Parameter	Existing Permit		Proposed Permit	
	Average Monthly	**Average Weekly**	**Average Monthly**	**Average Weekly**
$CBOD_5$ (in mg/L; lbs/day)	10 mg/L; 150 lbs/day	15 mg/L; 225 lbs/day	10 mg/L; 150 lbs/day	15 mg/L; 225 lbs/day
TSS (in mg/L; lbs/day)	15 mg/L; 225 lbs/day	25 mg/L; 345 lbs/day	15 mg/L; 225 lbs/day	25 mg/L; 345 lbs/day
Fecal Coliform Bacteria (in #colonies/100 mL)	100 colonies/100 mL	200 colonies/100 mL	100 colonies/100 mL	200 colonies/100 mL
Parameter	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Ammonia	4.4 mg/L; 66 lbs/day	8.8 mg/L; 132 lbs/day	4.4 mg/L; 66 lbs/day	8.8 mg/L; 132 lbs/day
Total Residual Chlorine (mg/L)	Not Applicable	0.033 mg/L; 0.50 lbs/day [a]	Not Applicable	0.09 mg/L; 1.36 lbs/day [a]
Oxygen	Not Applicable	Minimum 4.0 mg/L	Not Applicable	Minimum 4.0 mg/L
pH	Between 6 and 9 at all times.		Between 6 and 9 at all times.	
Chronic WET	No WET limitations		WET Limit [b]	
a- The Quantification Level shall be 0.09 mg/L. The associated mass loading limit shall be 1.36 lbs/day. Although the limit is 0.033 mg/L and 0.50 lbs/day exceedances of this limit shall not constitute an enforceable violation until the reported concentration meets or exceeds 0.09 mg/L and the mass loading limit of 1.36 lbs/day.				
b- The chronic toxicity limit is no statistically significant difference in test organism response between the chronic critical effluent concentration (CCEC), 2.5 % of the effluent, and the non-toxic control water.				

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in this permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, treatment method, past compliance, significance of pollutants, and monitoring costs. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for trickling filter plants with average design flows between 0.5 and 2.0 MGD.

WAC 173-220-210(1)(c) authorizes the Department to require "monitoring . . . influent to treatment facilities, . . . and/or receiving waters when determined to be necessary to verify compliance with net discharge limitations or removal requirements, . . . or to determine the effects of the discharge on the surface waters of the State." This permit requires the City to conduct analyses of influent, effluent and the receiving water to provide data to verify compliance with the State's water quality standards.

As a major discharger with significant industrial users, Special Condition S12. requires the City of Prosser to have influent and final effluent analyzed for toxic pollutants to help quantify the impacts of the industrial discharges, to determine pollutant removal efficiencies, and to determine compliance with the State's water quality standards. The monitoring data may also be used to develop local limits which commercial and industrial users must meet.

Sampling events to characterize of treatment plant influent and effluent, and whole effluent toxicity must to be carried out concurrently, or as simultaneously as possible. Concurrent sampling allows detailed assessment of treatment plant removal efficiencies and the effects of the facility's discharge on the Yakima River.

The City has significantly improved the equipment utilized to conduct compliance sampling at the treatment plant. Influent and effluent flow volumes will be measured with magnetic meters. The influent meter will be located at the headworks, before the screening and grit removal processes. Effluent flows will be measured after chlorination and before dechlorination. Flows will be continuously recorded.

The influent composite sampler is located at the headworks after the screening and grit removal processes. The effluent sampler is located after the dechlorination process and before the effluent enters the outfall pipe.

Monitoring for BOD, TSS, Ammonia, Total Phosphate, Residual Chlorine, Fecal Coliform Bacteria, Dissolved Oxygen, pH, Temperature and Flow is being required to further characterize the effluent.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The laboratory at this facility is accredited for the following parameters: Alkalinity, Ammonia, Biochemical Oxygen Demand, Chlorine, Dissolved Oxygen, Nitrate + Nitrite, pH, Suspended Solids, Fecal Coliform and Total Coliform.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

Two siphons cross the Yakima River and carry all wastewater from the city to the wastewater treatment plant. City does not believe it is possible to pressure test the two siphons. Because of the configuration at the upstream ends of these siphons, the Department recognizes the difficulty of conducting the test under current conditions; however the Department recommends performing pressure tests at a time in the future when such testing is feasible.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. This Special Condition is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required by Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by the US EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW, Chapter 173-308 WAC "Biosolids Management", and Chapter 173-350 WAC "Solid Waste Handling Standards".. The disposal of other solid waste is under the jurisdiction of the Benton County Health Department.

Biosolids shall be managed in accordance with the Final Coverage granted under the Statewide General Permit for Biosolids Management.

PRETREATMENT

Due to the volume of the discharges from industrial users, which have the potential to disrupt the POTW, the City has implemented a pretreatment program. The pretreatment program is explained in Chapter 13 of the City's Municipal Code, which contains the current Sewer Use Ordinance (SUO). The program's stated goals for pretreatment are to prevent treatment plant overloading, treatment process upsets, and pass-through of pollutants to the receiving water. An industrial facility whose discharge comprises 5 or more percent of the treatment plant's design loading for any one parameter is designated an Significant Industrial User (SIU), which corresponds to criteria in the Federal pretreatment regulations used to determine SIU status.

In addition to the standard discharge prohibitions contained in the Federal pretreatment standards and other requirements, the City's SUO contains:

- Concentration limits for conventional pollutants (BOD/TSS, 300 mg/L; fats, oil, and/or grease, 50 mg/L),
- Concentration limits for metals and other toxics,
- A detailed description of responsibilities for non-domestic dischargers.

In addition to State Waste Discharge permits and limitations contained in the SUO, industrial dischargers are regulated by contracts with the City. Contracts establish maximum flow and pollutant loadings for each discharger. The SUO also established a system of strong waste surcharges, by which dischargers are monetarily penalized by the City for exceedances of discharge limitations.

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10"

(1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. to act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs))**.** Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g., tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing SIUs (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)) (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.) Industrial dischargers need to apply for a State Waste Discharge Permit 60 days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g., tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system. Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of its responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

Requirements for Performing an Industrial User Survey

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of State waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Conducting an Industrial User Survey".

Annual Submittal of List of Industrial Users

This provision requires the POTW to submit annually a list of existing and proposed SIUs and PSIUs. This requirement is intended to update the Department on an annual basis of the status of industrial users in the POTW's service area, without requiring the POTW to go through the process of performing a formal Industrial User Survey. This provision is normally applied to POTWs not serving industrial or commercial users. Although this permit does not require performance of an Industrial User Survey, the Permittee is nevertheless required under the previous section, to take adequate continuous routine measures to identify existing and new industrial discharges.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, discharges of wastes with excessive BOD, petroleum-based oils, or that result in toxic gases are prohibited. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

OUTFALL EVALUATION

Proposed Special Condition S13. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

REFERENCES FOR TEXT AND APPENDICES

1997. City of Prosser: Wastewater Facility Plan. Gray and Osborne Inc., August, 1997.

Environmental Protection Agency (EPA)

1994. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-91/002, July 1994.

1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA/600/4-90/027F, August 1993.

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

U.S. Department of Interior, Bureau of Reclamation.

2002. Interim Comprehensive Operating Plan for the Yakima Project Washington.

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information
(http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 6, 2006 in the *Yakima Herald Republic* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on August 9, 2006 in the Prosser Record Bulletin to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This fact sheet and permit were written by Richard Marcley.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

$CBOD_5$ – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining $CBOD_5$ is given in 40 CFR Part 136.

Chlorine–Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity–The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)–The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)–The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection Without Sampling–A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection with Sampling–A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample–A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity–Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition–The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor–A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report–A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria–Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample–A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User– A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater–Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)–"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference – A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility–A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation–The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)–The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility–A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone–A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)–The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through – A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH–The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User–A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)– A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)–

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters–Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater–That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit–A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)–Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset–An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit–A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at (http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Regulatory Allowed Dilution Factors:

Acute Dilution Factor no more than 2.5% of low flow conditions.
Chronic Dilution Factor no more than 25% of low flow conditions.

AMZ (Acute Mixing Zone) Dilution Factor:

$$\frac{\text{Maximum Day Effluent Flow 2.25 CFS + River Flow 300 X 0.025}}{\text{Maximum Day Effluent Flow 2.25 CFS}} = 4.3 : 1$$

RMZ (Chronic Mixing Zone) Dilution Factor:

$$\frac{\text{Maximum Average Monthly Flow 1.92 CFS + River Flow 300 X 0.25}}{\text{Maximum Average Monthly Flow 1.92 CFS}} = 40.1 : 1$$

Spread of a plume from a point source in a river with boundary effects from the shoreline based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

INPUT	Acute	Chronic
1. Effluent Discharge Rate (cfs):	2.25	1.92
2. Receiving Water Characteristics Downstream From Waste Input		
Stream Depth (ft):	3.13	3.13
Stream Velocity (fps):	0.60	0.60
Channel Width (ft):	160.00	160.00
Stream Slope (ft/ft) or Manning roughness "n":	0.035	0.035
0 if slope or 1 if Manning "n" in previous cell:	1	1
3. Discharge Distance From Nearest Shoreline (ft):	30	30
4. Location of Point of Interest to Estimate Dilution		
Distance Downstream to Point of Interest (ft):	30	300
Distance From Nearest Shoreline (ft):	30	30
5. Transverse Mixing Coefficient Constant (usually 0.6):	0.6	0.6
6. Original Fischer Method (enter 0) or *Effective Origin* Modification (enter 1)	0	0

OUTPUT		
1. Source Conservative Mass Input Rate		
Concentration of Conservative Substance (%):	100.00	100.00
Source Conservative Mass Input Rate (cfs*%):	225.00	192.00
2. Shear Velocity		
Shear Velocity based on slope (ft/sec):	#N/A	#N/A
Shear Velocity based on Manning "n":		
using Prasuhn equations 8-26 and 8-54 assuming		
hydraulic radius equals depth for wide channel		
Darcy-Weisbach friction factor "f":	0.097	0.097
Shear Velocity from Darcy-Weisbach "f" (ft/sec):	0.066	0.066
Selected Shear Velocity for next step (ft/sec):	0.066	0.066
3. Transverse Mixing Coefficient (ft2/sec):	0.124	0.124
4. Plume Characteristics Accounting for Shoreline Effect (Fischer *et al.* , 1979)		
Co	7.49E-01	6.39E-01
x'	2.43E-04	2.43E-03
y'o	1.88E-01	1.88E-01
y' at point of interest	1.88E-01	1.88E-01
Solution using superposition equation (Fischer eqn 5.9)		
Term for n= -2	0.00E+00	0.00E+00
Term for n= -1	0.00E+00	8.79E-180
Term for n= 0	1.00E+00	1.00E+00
Term for n= 1	0.00E+00	6.24E-119
Term for n= 2	0.00E+00	0.00E+00
Upstream Distance from Outfall to *Effective Origin* of Effluent Source (ft)	#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)	30.00	300.00
x' Adjusted for *Effective Origin*	2.43E-04	2.43E-03
C/Co (dimensionless)	1.81E+01	5.73E+00
Concentration at Point of Interest (Fischer Eqn 5.9)	1.36E+01	3.66E+00
Unbounded Plume Width at Point of Interest (ft)	14.096	44.575
Unbounded Plume half-width (ft)	7.048	22.288
Distance from near shore to discharge point (ft)	30.00	30.00
Distance from far shore to discharge point (ft)	130.00	130.00
Plume width bounded by shoreline (ft)	14.10	44.58
Approximate Downstream Distance to Complete Mix (ft):	32,661	32,661
Theoretical Dilution Factor at Complete Mix:	133.547	156.500
Calculated Flux-Average Dilution Factor Across Entire Plume Width:	11.765	43.600
Calculated Dilution Factor at Point of Interest:	7.373	27.322

Bottom Discharge

Chronic Mixing Zone effluent flow @ 1.92 CFS.

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
                        CORMIX-GI Version 4.3GT
                     HYDRO2:Version-4.3.0.2  June,2005
SITE NAME/LABEL:
  DESIGN CASE:                  Surface
  FILE NAME:                    Y:\WPFILES\MARCLEY\CINDY DRAFTS\Prosser STP
Using subsystem CORMIX2:        Submerged Multiport Diffuser Discharges
  Start of session:             05/01/2006--14:50:31
*******************************************************************************
SUMMARY OF INPUT DATA:
-------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                         BS      = 50.90 m
  Channel regularity            ICHREG  = 1
  Ambient flowrate              QA      = 8.50 m^3/s
  Average depth                 HA      = 0.91 m
  Depth at discharge            HD      = 0.64 m
  Ambient velocity              UA      = 0.1825 m/s
  Darcy-Weisbach friction factor F      = 0.0990
    Calculated from Manning's n         = 0.035
  Wind velocity                 UW      = 1 m/s
Stratification Type             STRCND  = U
  Surface temperature                   = 21
 degC
  Bottom temperature                    = 21 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density               RHOAS   = 997.9934 kg/m^3
  Bottom density                RHOAB   = 997.9934 kg/m^3
-------------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Multiport Diffuser Discharge
  Diffuser type                 DITYPE  = staged parallel
  Diffuser length               LD      = 12.19 m
  Nearest bank                          = left
  Diffuser endpoints            YB1     = 3.66 m;     YB2 = 12.19 m
  Number of openings            NOPEN   = 111
  Spacing between risers/openings SPAC  = 0.11 m
  Port/Nozzle diameter          DO      = 0.0549 m
    with contraction ratio              = 1
  Equivalent slot width         BO      = 0.0215 m
  Total area of openings        TAO      = 0.2624 m^2
  Discharge velocity            UO      = 0.21 m/s
  Total discharge flowrate      QO      = 0.054368 m^3/s
  Discharge port height         HO      = 0.17 m
  Nozzle arrangement            BETYPE  = staged
  Diffuser alignment angle      GAMMA   = 45 deg
  Vertical discharge angle      THETA   = 60 deg
  Horizontal discharge angle    SIGMA   = 45 deg
  Relative orientation angle    BETA    = 0 deg
  Discharge temperature (freshwater)    = 23 degC
    Corresponding density       RHOO    = 997.5393 kg/m^3
  Density difference            DRHO    = 0.4541 kg/m^3
  Buoyant acceleration          GPO     = 0.0045 m/s^2
  Discharge concentration       CO      = 2 deg.C
  Surface heat exchange coeff.  KS      = 0 m/s
  Coefficient of decay          KD      = 0 /s

PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts one bank only at 201.00 m downstream.
********************** TOXIC DILUTION ZONE SUMMARY ********************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ******************
The plume conditions at the boundary of the specified RMZ are as follows:
  Pollutant concentration                = 0.122591  deg.C
Corresponding dilution                   = 16.3
  Plume location:                      x = 91.44 m
    (centerline coordinates)           y = 4.31 m
                                       z = 0.64 m
  Plume dimensions:           half-width = 2.64 m
                               thickness = 0.91 m
Cumulative travel time:       666.8900 sec.
At this position, the plume is NOT IN CONTACT with any bank.
```

Acute Mixing Zone effluent flow @ 2.25 CFS

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
                       CORMIX-GI Version 4.3GT
                     HYDRO2:Version-4.3.0.2  June,2005
  SITE NAME/LABEL:
    DESIGN CASE:                  Surface
    FILE NAME:                    Y:\WPFILES\MARCLEY\CINDY DRAFTS\Prosser STP'
  Using subsystem CORMIX2:        Submerged Multiport Diffuser Discharges
    Start of session:             05/01/2006--15:02:01
  ******************************************************************************
  SUMMARY OF INPUT DATA:
  ------------------------------------------------------------------------------
  AMBIENT PARAMETERS:
    Cross-section                          = bounded
    Width                          BS      = 50.90 m
    Channel regularity             ICHREG  = 1
    Ambient flowrate               QA      = 8.50 m^3/s
    Average depth                  HA      = 0.91 m
    Depth at discharge             HD      = 0.64 m
    Ambient velocity               UA      = 0.1825 m/s
    Darcy-Weisbach friction factor F       = 0.0990
      Calculated from Manning's n          = 0.035
    Wind velocity                  UW      = 1 m/s
  Stratification Type              STRCND  = U
    Surface temperature                    = 21
   degC
    Bottom temperature                     = 21 degC
    Calculated FRESH-WATER DENSITY values:
    Surface density                RHOAS   = 997.9934 kg/m^3
    Bottom density                 RHOAB   = 997.9934 kg/m^3
  ------------------------------------------------------------------------------
  DISCHARGE PARAMETERS:            Submerged Multiport Diffuser Discharge
    Diffuser type                  DITYPE  = staged parallel
    Diffuser length                LD      = 12.19 m
    Nearest bank                           = left
    Diffuser endpoints             YB1     = 3.66 m;    YB2 = 12.19 m
    Number of openings             NOPEN   = 111
    Spacing between risers/openings SPAC   = 0.11 m
    Port/Nozzle diameter           DO      = 0.0549 m
      with contraction ratio               = 1
    Equivalent slot width          BO      = 0.0215 m
    Total area of openings         TAO      = 0.2624 m^2
    Discharge velocity             UO      = 0.24 m/s
    Total discharge flowrate       QO      = 0.063713 m^3/s
    Discharge port height          HO      = 0.17 m
    Nozzle arrangement             BETYPE  = staged
    Diffuser alignment angle       GAMMA   = 45 deg
    Vertical discharge angle       THETA   = 60 deg
    Horizontal discharge angle     SIGMA   = 45 deg
    Relative orientation angle     BETA    = 0 deg
    Discharge temperature (freshwater)     = 23 degC
      Corresponding density        RHOO    = 997.5393 kg/m^3
    Density difference             DRHO    = 0.4541 kg/m^3
    Buoyant acceleration           GPO     = 0.0045 m/s^2
    Discharge concentration        CO      = 2 deg.C
    Surface heat exchange coeff.   KS      = 0 m/s
    Coefficient of decay           KD      = 0 /s
********************** REGULATORY MIXING ZONE SUMMARY **********************
The plume conditions at the boundary of the specified RMZ are as follows:
  Pollutant concentration                = 0.566977  deg.C
Corresponding dilution                   = 3.5
  Plume location:                      x = 9.14 m
    (centerline coordinates)           y = 4.31 m
                                       z = 0.64 m
  Plume dimensions:           half-width = 1.26 m
                               thickness = 0.49 m
Cumulative travel time:       190.589 sec.
At this position, the plume is NOT IN CONTACT with any bank.
```

Surface Discharge Acute Dilution Factor

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
                        CORMIX-GI Version 4.3GT
                     HYDRO3:Version-4.3.0.2  June,2005
SITE NAME/LABEL:
  DESIGN CASE:                  Surface
  FILE NAME:                    Y:\WPFILES\MARCLEY\CINDY DRAFTS\Prosser STP\
Using subsystem CORMIX3:        Buoyant Surface Discharges
  Start of session:             05/01/2006--18:07:41
*******************************************************************************
SUMMARY OF INPUT DATA:
-------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                         BS      = 50.90 m
  Channel regularity            ICHREG  = 1
  Ambient flowrate              QA      = 8.50 m^3/s
  Average depth                 HA      = 0.91 m
  Depth at discharge            HD      = 0.64 m
  Ambient velocity              UA      = 0.1825 m/s
  Darcy-Weisbach friction factor F      = 0.0990
    Calculated from Manning's n         = 0.035
  Wind velocity                 UW      = 1 m/s
Stratification Type             STRCND  = U
  Surface temperature                   = 21
 degC
  Bottom temperature                    = 21 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density               RHOAS   = 997.9934 kg/m^3
  Bottom density                RHOAB   = 997.9934 kg/m^3
-------------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Buoyant Surface Discharge
  Discharge located on                  = left bank/shoreline
  Discharge configuration               = protruding discharge
  Distance from bank to outlet  DISTB   = 1.39 m
  Discharge angle               SIGMA   = 45 deg
  Depth near discharge outlet   HDO     = 0.05 m
  Bottom slope at discharge     SLOPE   = 15 deg
  Circular pipe diameter                = 0.0549 m
    Equivalent rectangular discharge:
    Discharge cross-section area AO     = 0.002364 m^2
    Discharge channel width     BO      = 0.043090 m
    Discharge channel depth     HO      = 0.054864 m
    Discharge aspect ratio      AR      = 1.273240
  Discharge flowrate            QO      = 0.063713 m^3/s
  Discharge velocity            UO      = 26.95 m/s
  Discharge temperature (freshwater)    = 23 degC
    Corresponding density       RHOO    = 997.5393 kg/m^3
  Density difference            DRHO    = 0.4541 kg/m^3
  Buoyant acceleration          GPO     = 0.0045 m/s^2
  Discharge concentration       CO      = 2 deg.C
  Surface heat exchange coeff.  KS      = 0 m/s
  Coefficient of decay          KD      = 0 /s
-------------------------------------------------------------------------------
********************** REGULATORY MIXING ZONE SUMMARY **********************
The plume conditions at the boundary of the specified RMZ are as follows:
  Pollutant concentration               = 0.108625  deg.C
Corresponding dilution                  = 18.4
  Plume location:                     x = 9.16 m
    (centerline coordinates)          y = -6.23 m
                                      z = 0 m
  Plume dimensions:            half-width = 1.00 m
                                thickness = 0.64 m
```

Chronic Dilution Factor

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
                        CORMIX-GI Version 4.3GT
                     HYDRO3:Version-4.3.0.2  June,2005
SITE NAME/LABEL:
  DESIGN CASE:                  Surface
  FILE NAME:                    Y:\WPFILES\MARCLEY\CINDY DRAFTS\Prosser STP
Using subsystem CORMIX3:        Buoyant Surface Discharges
  Start of session:             05/01/2006--18:12:27
*******************************************************************************
SUMMARY OF INPUT DATA:
-------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                         BS      = 50.90 m
  Channel regularity            ICHREG  = 1
  Ambient flowrate              QA      = 8.50 m^3/s
  Average depth                 HA      = 0.91 m
  Depth at discharge            HD      = 0.64 m
  Ambient velocity              UA      = 0.1825 m/s
  Darcy-Weisbach friction factor F      = 0.0990
    Calculated from Manning's n         = 0.035
  Wind velocity                 UW      = 1 m/s
Stratification Type             STRCND  = U
  Surface temperature                   = 21
 degC
  Bottom temperature                    = 21 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density               RHOAS   = 997.9934 kg/m^3
  Bottom density                RHOAB   = 997.9934 kg/m^3
-------------------------------------------------------------------
DISCHARGE PARAMETERS:           Buoyant Surface Discharge
  Discharge located on                  = left bank/shoreline
  Discharge configuration               = protruding discharge
  Distance from bank to outlet  DISTB   = 1.39 m
  Discharge angle               SIGMA   = 45 deg
  Depth near discharge outlet   HDO     = 0.05 m
  Bottom slope at discharge     SLOPE   = 15 deg
  Circular pipe diameter                = 0.0549 m
    Equivalent rectangular discharge:
    Discharge cross-section area AO     = 0.002364 m^2
    Discharge channel width     BO      = 0.043090 m
    Discharge channel depth     HO      = 0.054864 m
    Discharge aspect ratio      AR      = 1.273240
  Discharge flowrate            QO      = 0.054368 m^3/s
  Discharge velocity            UO      = 23.00 m/s
  Discharge temperature (freshwater)    = 23 degC
    Corresponding density       RHOO    = 997.5393 kg/m^3
  Density difference            DRHO    = 0.4541 kg/m^3
  Buoyant acceleration          GPO     = 0.0045 m/s^2
  Discharge concentration       CO      = 2 deg.C
  Surface heat exchange coeff.  KS      = 0 m/s
  Coefficient of decay          KD      = 0 /s
********************** REGULATORY MIXING ZONE SUMMARY ***********************
The plume conditions at the boundary of the specified RMZ are as follows:
  Pollutant concentration               = 0.043226  deg.C
Corresponding dilution                  = 46.3
  Plume location:                     x = 91.47 m
    (centerline coordinates)          y = -16.41 m
                                      z = 0 m
  Plume dimensions:           half-width = 5.28 m
                               thickness = 0.64 m
Cumulative travel time < 847.5491 sec. (RMZ is within NFR)
At this position, the plume is NOT IN CONTACT with any bank.
Furthermore, the specified water quality standard has indeed been met
  within the RMZ. In particular:
The ambient water quality standard was encountered within a control
  volume describing a portion of the discharge plume.
Therefore, the following plume conditions are a conservative estimate (with
  lower concentrations or with larger dimensions) for the region at whose
  boundary the standard is met:
  Local boundary concentration          = 2  deg.C
Corresponding dilution                  = 1
  Water quality standard                = 21  deg.C
Corresponding dilution                  = 0.1
  Plume location:                     x = 0.07 m
    (centerline coordinates)          y = -0.07 m
                                      z = 0 m
  Plume dimensions:           half-width = 0.03 m
                               thickness = 0.07 m
```

Visual Plumes
Port elevation 16”

```
/ UM3. 5/1/2006 4:24:58 PM
Case 1; ambient file c:\plumes\VP plume 45.001.db; Diffuser table record 1: ----------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol      Decay   Far-spd   Far-dir   Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s       deg  m0.67/s2   sigma-T
       0.0     0.183       0.0      0.01      21.0 1.0000E-9    0.0001         -         -    0.0003    -1.937
     0.914     0.183       0.0      0.01      21.0 1.0000E-9    0.0001         -         -      0.01    -1.937

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)     ()    (in)    (ft)    (ft)    (in) (ft3/s)   (psu)     (C)   (ppm)
     2.0    16.0    60.0    45.0   111.0     8.0    30.0   300.0    26.0    2.25    0.01    23.0 1.00E-3

Simulation:
Froude number:       18.8; effluent density (sigma-T) -2.39134074; effluent velocity     0.283(m/s);
        Depth  Amb-cur    P-dia  AcuteMZ  ChrncMZ  Polutnt   Dilutn  CL-diln   x-posn   y-posn
Step     (in)   (ft/s)     (in)     (ft)     (ft)    (ppm)       ()       ()     (in)     (in)
   0     26.0      0.6      2.0     30.0    300.0    0.001      1.0      1.0      0.0      0.0; ceiling;
   5    25.89      0.6    2.147     30.0    300.0    0.001    1.092    1.092   0.0473   0.0432; begin overlap;
  66    24.76      0.6    4.222     30.0    300.0    0.001    2.839    2.839    1.215    0.505; end overlap;
 100    23.89      0.6    5.994     30.0    300.0    0.001    5.542    5.542    3.599    0.857;
 104    23.77      0.6    6.234     30.0    300.0    0.001    5.999    5.999    4.092    0.907; merging;
 189    13.47      0.6    27.32     30.0    300.0    0.001    32.29    32.29    129.0    4.617; surface;
 197    11.22      0.6    31.96     30.0    300.0    0.001    37.83    37.83    171.5    5.282; matched energy radi
 200    10.28      0.6     33.9     30.0    300.0    0.001    40.15    40.14    190.3    5.547;
 220     2.24      0.6    50.28     30.0    300.0    0.001    59.65    59.65    366.8    7.496; acute zone;
 262   -30.37      0.6    115.4     30.0    300.0    0.001    137.0    137.0   1189.5    12.27; stream limit reache
```

Port elevation 0

```
4:24:59 PM. amb fills: 2
/ UM3. 5/1/2006 4:26:04 PM
Case 1; ambient file c:\plumes\VP plume 45.001.db; Diffuser table record 1: ----------------------------------

Ambient Table:
     Depth   Amb-cur   Amb-dir   Amb-sal   Amb-tem   Amb-pol      Decay   Far-spd   Far-dir   Disprsn   Density
         m       m/s       deg       psu         C     kg/kg       s-1       m/s       deg  m0.67/s2   sigma-T
       0.0     0.183       0.0      0.01      21.0 1.0000E-9    0.0001         -         -    0.0003    -1.937
     0.914     0.183       0.0      0.01      21.0 1.0000E-9    0.0001         -         -      0.01    -1.937

Diffuser table:
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)     ()    (in)    (ft)    (ft)    (in) (ft3/s)   (psu)     (C)   (ppm)
     2.0     0.0    60.0    45.0   111.0     8.0    30.0   300.0    26.0    2.25    0.01    23.0 1.00E-3

Simulation:
Froude number:       18.8; effluent density (sigma-T) -2.39134074; effluent velocity     0.283(m/s);
        Depth  Amb-cur    P-dia  AcuteMZ  ChrncMZ  Polutnt   Dilutn  CL-diln   x-posn   y-posn
Step     (in)   (ft/s)     (in)     (ft)     (ft)    (ppm)       ()       ()     (in)     (in)
   0     26.0      0.6      2.0     30.0    300.0    0.001      1.0      1.0      0.0      0.0; ceiling;
   1    25.97      0.6     2.02     30.0    300.0    0.001     1.02     1.02   0.0117   0.0112; bottom hit;
   5    25.89      0.6    2.147     30.0    300.0    0.001    1.092    1.092   0.0473   0.0432; begin overlap;
  66    24.76      0.6    4.222     30.0    300.0    0.001    2.839    2.839    1.215    0.505; end overlap;
 100    23.89      0.6    5.994     30.0    300.0    0.001    5.542    5.542    3.599    0.857;
 104    23.77      0.6    6.234     30.0    300.0    0.001    5.999    5.999    4.092    0.907; merging;
 189    13.47      0.6    27.32     30.0    300.0    0.001    32.29    32.29    129.0    4.617; surface;
 197    11.22      0.6    31.96     30.0    300.0    0.001    37.83    37.83    171.5    5.282; matched energy radi
 200    10.28      0.6     33.9     30.0    300.0    0.001    40.15    40.14    190.3    5.547;
 220     2.24      0.6    50.28     30.0    300.0    0.001    59.65    59.65    366.8    7.496; acute zone;
 262   -30.37      0.6    115.4     30.0    300.0    0.001    137.0    137.0   1189.5    12.27; stream limit reache
```

			Chemical Analysis of Receiving Water							
Date	9/22/2003	1/26/2004	4/22/2004	7/27/2004	9/22/2004	12/28/2004	3/7/2005	6/29/2005	9/27/2005	90th Percentile
Cu	1.67	0.92	0.95	1.43	1.18	0.75	0.82	1.07	0.89	1.478
Ni	0.79	0.49	0.4	<0.20	,0.20	0.19	0.18	0.33	0.05	0.61
Zn	4.69	1.07	1.01	0.47	0.92	0.92	1.16	1.57	0.19	2.194
Arsnic	2.04	-	1.18	2.64	2.07	1.01	1.24	2.24	2.01	2.36
Hardness	113	92	81.7	156	95.6	79.3	83.6	89.3	127	132.8

REASONABLE POTENTIAL **CALCULATIONS**

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

				State Water Quality Standard		Max concentration at edge of...					Max effluent conc. measured (metals as total recoverable)	Coeff Variation					
Parameter	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Conc (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value					# of samp	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n			
CHLORINE			0.0000	19.00	11.00	10.05	1.08	NO		0.938	40.00	0.85	0.74	47	1.08	4.30	40.00
AMMONIA			32.0	3700.0	590.0	3257.05	378.69	NO		0.938	12400.00	1.51	1.09	47	1.12	4.30	40.00
ZINC	0.95	0.95	5.0	90.70	82.83	27.3	7.40	NO	0.95	0.224	28.00	0.60	0.55	2	3.79	4.30	40.00
COPPER	1.00	1.00	1.4780	13.14	8.98	6.61	2.03	NO	0.95	0.224	6.20	0.60	0.55	2	3.79	4.30	40.00
LEAD	0.47	0.47	0.1000	23.00	0.92	1.64	0.27	NO	0.95	0.224	3.80	0.60	0.55	2	3.79	4.30	40.00

REASONABLE POTENTIAL TO VIOLATE HUMAN HEALTH WATER QUALITY CRITERIA

Revised 3/00

	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation		# of samples from which # in col. K was taken	Multiplier	AVG USED INSTEAD of Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Parameter	ug/L	ug/L	ug/L			ug/L	ug/L		Pn	ug/L	CV	S	n			
Chloroform	0.0	5.70	0.34	NO	0.03	NONE	NONE	0.50	0.22	8.90	0.60	0.6	2	1.52		40.0
BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	0.0	1.80	0.96	NO	0.03	NONE	NONE	0.50	0.05	15.40	0.60	0.6	1	2.49		40.0
BROMOFORM 75252 5V	0.0	4.30	0.02	NO	0.03	NONE	NONE	0.50	0.05	0.31	0.60	0.6	1	2.49		40.0
DICHLOROBROMOMETHANE 75274 12V	0.0	0.27	0.16	NO	0.03	NONE	NONE	0.50	0.22	4.20	0.60	0.6	2	1.52		40.0
BHC - GAMMA 58899 4P (Lindane)	0.0	0.019	0.001	NO	0.02	NONE	NONE	0.50	0.05	0.01	0.60	0.6	1	2.49		40.0

Prosser WWTP Chronic WET Test Results as NOEC/LOEC in % Effluent

Test #	Sample Date	Start Date	Lab	Organism	Endpoint	NOEC	LOEC	MSDp
khan092	September 22, 2004	September 23, 2004	Nautilus Environmental	Ceriodaphnia dubia	7-day Survival	100	> 100	
					Reproduction	56	100	24.26%
khan093	September 22, 2004	September 23, 2004	Nautilus Environmental	fathead minnow	7-day Survival	100	> 100	8.26%
					Biomass	100	> 100	15.53%
					Weight	100	> 100	14.43%
khan096	September 29, 2004	September 30, 2004	Nautilus Environmental	green alga	Cell Density	100	> 100	7.51%
khan131	September 26, 2005	September 27, 2005	Nautilus Environmental	Ceriodaphnia dubia	7-day Survival	100	> 100	
					Reproduction	100	> 100	41.22%
khan132	September 26, 2005	September 27, 2005	Nautilus Environmental	fathead minnow	7-day Survival	100	> 100	2.50%
					Biomass	100	> 100	14.20%
					Weight	100	> 100	14.20%
khan133	October 5, 2005	October 6, 2005	Nautilus Environmental	green alga	Cell Density	12.5	25	12.17%

Ammonia Criterion Calculation

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992

INPUT	
1. Ambient Temperature (deg C; 0<T<30)	23.0
2. Ambient pH (6.5<pH<9.0) at edge	8.70
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15
OUTPUT	
1. Intermediate Calculations:	
Acute FT	1.00
Chronic FT	1.41
FPH	1.00
RATIO	14
pKa	9.31
Fraction Of Total Ammonia Present As Un-ionized	19.8312%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	260.0
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	42.0
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	1.3
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	0.2
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	1.1
Chronic Ammonia Criterion as N	0.17

Chronic Mass Balance Temperature Model

25% of 300 CSF = 75 CSF

CHRONIC DILUTION

eff. flow csf	effluent ° C	river flow csf	Ambient° C	Final Temp	dil factor
1.92	27	75	23	23.100	40.00

Allowed Temp Rise 0.30°C when is Ambient Above 21°C = 0.30° > 0.10°C

Nor Allowed Temp Rise t=34/(T(23)+9 = 1.063 ° C at any time

Temp Rise 0.10< 1.063 & < 0.30

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT	Effluent @ Max pH	Effluent @ Min pH
1. DILUTION FACTOR AT CHRONIC MIXING ZONE BOUNDARY	40.000	40.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS		
Temperature (deg C):	23.00	23.00
pH:	8.70	8.70
Alkalinity (mg CaCO3/L): Prosser Receiving Water Study Critical Season Average	180.00	180.00
2. EFFLUENT CHARACTERISTICS		
Temperature (deg C): Maximum report temperature	27.00	27.00
pH:	8.00	6.90
Alkalinity (mg CaCO3/L): 90th Percentile	0.00	0.00
OUTPUT		
1. IONIZATION CONSTANTS		
Upstream/Background pKa:	6.36	6.36
Effluent pKa:	6.34	6.34
2. IONIZATION FRACTIONS		
Upstream/Background Ionization Fraction:	1.00	1.00
Effluent Ionization Fraction:	0.98	0.78
3. TOTAL INORGANIC CARBON		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	180.83	180.83
Effluent Total Inorganic Carbon (mg CaCO3/L):	0.00	0.00
4. CONDITIONS AT MIXING ZONE BOUNDARY		
Temperature (deg C):	23.10	23.10
Alkalinity (mg CaCO3/L):	175.50	175.50
Total Inorganic Carbon (mg CaCO3/L):	176.31	176.31
pKa:	6.36	6.36
pH at Mixing Zone Boundary:	8.70	8.70

APPENDIX D--RESPONSE TO COMMENTS

No comments were received by the Department of Ecology.